### RELIGION AND ROMANCE.

# Tales of Creation and of

Legendary Heroes.

COLLECTED FROM THE INDIANS IN CALIFORNIA, MEXICO, AND GUATEMALA. BY JEREMIAH CURTIN. Copyright, 1898, by Jersmiah-Curtin. XV-THE HAKAS AND TENNAS.

Dari Jowa, cagle; Hakayamchiwi, the whole Haka people; Haka, film; libataim, lightning; Tenns, grizif bear; Tsawandi Kamehu, red film clover; Taa-wandi Kamehupa, young red filmt clover; Tauwalkal, reddiah film.

At first about two hundred people lived with the old woman, Tsuwalkai Martmi, in one great houser they were all descended from her; they were the Hakayamchiwi-all the Haka peo-

Now, there was a deadly quarrel between the Hakas and the Tennas, who lived near them, and it began in this way:

The Tennas invited the Hakas to a hunt in the mountains; ten of each people were to make a party of twenty. One Tenna went early the first morning to make a fire at some distance from each sweat house, at a meeting place for the hunters of both sides. Ten Hakas went out early; were first-at the fire; but the Tennas came, and then the twenty stood around to warm themselves, the Tennas on the north and the Hakas on the south side of the fire.

The Hakas had fint arrow heads; good ones. The Tennas had arrow heads of pine bark. While they were warming themselves a Tenna said to a Haka:

'Let me see your arrow point." "Here it is," said the Haka; "look at it."
"He, he, he!" laughed the Tenna, "that

point is no good!" He beld it out, looked at it, and laughed

"If I put it down my throat it would not "Let me see your arrow point," said the

"Here it is." said the Tenna-

The Haka looked at the pointed pine bark, laughed, and said: "That is no arrow head; that is nothing but pine bark. If I stab mybehind with your arrow head it won't hurt me. I won't die." "Let me see you stab yourself," said the

Tenna. Look at me. I'll stab myself behind with

awhile the ten Hakas came and stood at the fire in the same way as their brothers had stood the day before. They did not quarrel this time, but went soon to the woods. The Tennas had everything ready to hunt; other Fennas were hidden in the woods, and ten more Hakas were killed that day.

On the third morning a Tenna came to the Hakas and called: "Cousins, it is time to be up. Your brothers of yesterday and the day before are waiting for you."

"We will go; we will go," said the Hakas.

The fire was ready; the Tennas were there.

great hurry. I took only a small piece of meat."

If took out the heart, cut it in small bits, roused it by the fire; then gave some to each woman. The women were hungry, and they were slad to get meat.

"Have you no bread!" asked Tsawandi.

"We have you no bread!" asked Tsawandi.

"We have no bread!" asked Tsawandi.

"We have you no bread!" asked Tsawandi.

"We lave no bread!" asked Tsawandi.

"We have you no bread!" asked Tsawandi.

"We have you for fer fint meat."

"We late you no bread!" asked Tsawandi.

"We late you no bread!" asked Ts

The fire was ready; the Tennas were there. They came earlier, and acted just as they acted the second day. Ten more Hakas were killed. The Hakas would not go on the fourth day. The Tennas began now to kill Hakas whenever they found them out hunting, fishing, or anywhere in the woods. When the Haha women

could not go into the house, and she would not go out. They wanted to kill her and put an

and to the Haka people.

While Tsuwalkai was crying the second night the Tennas were near the house listening

and watching. "The old woman is laughing," said they. "She is having some feast. That is why she is laughing. She must be glad, the old woman," Tsuwalkat heard these words of her enemies.

"Do not talk that way, Tennas," said she. Something may happen yet that will hurt you. Some one may come who will make your hearts sore. You may drop tears yet. You may be The old woman cried the third night and

third day. The fourth night she dropped no tears, but she could not sleep. In the middle of the fourth night she heard crying on the ground near Tsawandi Kamshu's bed. A little baby was crying, rolling, straggling, wailing. The old woman listened, heard "U She was frightened at first.

"I must be dreaming of a baby, I must be dreaming," said she. "Oh, my people are making me dream. I hear a noise like the crying of a baby in may sweat house. Oh, it

s no baby, I am only dreaming." The baby cried on, kept crying. The old woman went to the spot where the crying was, booked, found a baby all full of dirt, mud, and ashes. She had not carried the ashes out, she not carry them. The Tennas were watching outside for her, watching to kill the old woman. The baby rolled around in the

"I don't think any one brought that baby

self. "Tsawandi Kamshu said that a baby would come from the ground, would rise from his spittle. Maybe this is his spirit that has come back and is a baby again. I will call this baby Tsawandi Kamshupa" [young Trawandi Kamshu). She took up the baby, a the little child was so dirty. She washed him in cold water and he grew while she washed. She washed him till morning, but gave him

The Tennas heard now the noise of two people inside. Tsuwalkai Marimi felt glad she had the company of this little boy. All day and two nights she washed the child. He are

"I want you to live and grow large, little said the old woman. "I want you to grow quickly; you will be a great help to me."
The little boy did not know what was said yet. She washed the child, talked three days and three nights to him. The little boy could creep around the house new, could creep through every part of it. She washed him in the night, in the day; washed him often. He grew very fast. In ten days he was a man full grown. He could talk now as well as any one, and one day he asked the old woman;

"What house is this? What people live

and one day he asked the old woman:

"What house is this? What people live here?"

She told him the whole story of her people: told how all had been killed by the Tennas in the woods, in the fields, on the water. "I am sorry to hear what you tell," said he.

He asked now for a bow. She gave him a fresh one. He broke it. "I want one to kill birds with outside."

"You must not go out," said the old woman: "bad people are near us,"

"I only want to kill birds. Whose weapons are these," asked he, pointing to knives, bows, and arrows on the walls.

"Oh, it makes me sorry to tell you, to talk of them. These are the arms of many people. The Tennas killed them all." She went to the west side of the house and gave him bows. He broke one after another. He broke every bow on the walls except one. When he came to galpuchi pomana, his own old bow, he laughed. He took it himself without asking. He tried and could not break it. Tried again, laughed, and was gled.

"Tsuwaikal, whose bow is this?" asked he.

"That was the bow of a good man."

"He was a good man, I think," said Teawandi Kamshupa; "why did he die? There was a good man it this house; he had that bow; he was a great fighter."

Tsawandi Kamshupa tried again to break the bow with feet and hands, but he could not.

"There was a closel tran in this nouse," said the old woman, "the best man. That was his hew," "I wished to go hunting to-day, but I will

how."

"I wished to go hunting to-day, but I will go very early to-marrow, I will go before daylight," said T-awandi Kamshura,
"I am going to leok around. I am going a short distance to hunt. I will come back, have no fear."

short distance to hunt. I will come back, have no fear."

She was afraid. She had lost the owner of the bow, the best of her grandsons. "I will go down south a little way." said he.

Early next morning he took a samauna, a blanket of deer skin, wrapped it around his bedy, and tied a belt around his waist, took his arrows. There was dew on the grass yet. He looked down the hillside and saw many people near a hig fire, and said: "I know who those people are. They are Teptewi" [Tenna women].

There were fifty of them there. They had come to that swampy mourtain side early in the morning. They had come before daybreak to dig worms and gather clover. Each had a stick to dig worms and gather clover. Each had a stick to dig worms and sather clover.

"Look at me. I'll stab myself behind with it."

The Haka stabbed himself, and the Tenna's arrow head broke; it did not hurt him a bit. "You see," said he. "I am not dying."

"Let me see your arrow head," said the Tenna.

He gave the arrow point and the Tenna stabbed himself in the same way that the Haka had. The arrow head was very sharp and went into him; cut him; cut his intestines. He fell over and lay on the ground; lay there groaning.

"You see that my arrow head is good; it will kill any one," said the Haka. Right away the Tenna was dying; very-soon he was dead. When the Tennas saw that their brother was dead they rushed at the ten Hakas and killed ther hand to hand before they could use arrows; before they could save themselves.

The Tennas went home, but the Hakas did not go home that evening.

Next morning early one of the Tennas came to the house of the Hakas and called cut: "Come to the fire, was will meet you there. Oh, cousins, it is time to go hunting; be up. Your brothers who went yesterday are going to-day again."

"We will go." said the Hakas, who did not know that their brothers/had been killed.

The Tennas had built affer in the same place as the day before, and were there first. After awhile the ten Hakas camewand stood at the fire in the same way as their brothers had stood the day before. They did not quarrel this time, but went soon to the woods. The Tornas had built affer in the same way as their brothers had stood the day before. They did not quarrel this time, but went soon to the woods. The Tornas had built affer in the same place as the day before, and were there first. After awhile the ten Hakas camewand stood at the fire in the same way as their brothers had stood the day before. They did not quarrel this time, but went soon to the woods. The Tornas were hungry, and they woomen were

The bread tasted good; all atc. He watched The bread tasted good; all ate. He watched their teeth closely. Very soon a woman fell over dead; then all fell quickly and died. He cut their hearts out fifty hearts—and carried them under his blanket of deer-sin. He went further south how; ran quickly. He saw fifty more women working near a fire; went up close to the fire, sprang to it, and cried;

where in the woods. When the Hala women went to dig roots or worms or gather accorns the Tennas killed them. When the children went out to play or went for water they killed them. The Tennas killed on till of all the Hakas only one old woman, Tsuwalkai Marimi, and her grandson, Tsawandi Kamshu, were left.

One evening Tsawandi Kamshu hung his bow (an old bow bound around with deer sinew) over his bed on the south side of the house. With this bow he hung an otter skin quiver full of arrows.

"My grandmother," said he in the night, "I may not come back to-morrow. If anything happens, the bow and the quiver and all that are with them will fall on the bed. You will know then that I am dead. But from the spititle which I have left near the head of the bed a child will rise, a little boy will come up through the ground."

Tsuwalkai Marimi listened, said nothing, and made no answer. Tswandi Kamshu went out the next morning at daybreak istayed out the next morning in the next of th

No. "Oh no." whispered others. "Tsawendi Kamshu is dead this good while. We killed him."

"What are you telling each other?" interrated Tsawandi Kams. una. "I am not Tsawandi Kamshu. He does not look like me. He is my brother. He sent me to ask you to hunt. I killed sonn deer on the way here, but could bring only the hearts, I was kangry so much. Here are these deer hearts."

He cut the hearts into places, gave them around. They roasted the hearts and ate them. He gave flint broad to them, as he had to the winen en the mountain slone. All ate the bread, braised it, asked for more, ate it very eagerly. They began soon to fall on every side. Four Teams only would not eat the flint bread. They closed the ground deer, fastened it cutside, sent to the top of the sweat house, and witheld. Soon every Teams in the sweat house, and witheld. Soon every Teams in the sweat house lay dead.

Tsawindi Kamshuma hooked up and saw the four Teams there booking down at him. Their four heads were very close together, and they looked very ancers.

"What are you four men leoling down here se? What are you four men leoling down here have fone to sleep and won't talk with me. I want you to talk. Come down, you, and talk a while with me here before I go home."

The four Fennes said nothing.

"You want to catch me. I know that. I will know you how I can Jump."

They said nothing, wetched sharply, sitting opnosite each other with their long teeth sticking out. When he saw that they would not leave the opening, he said: "I will show you how I can Jump."

They said nothing, wetched sharply, sitting opnosite each other with their long teeth sticking out. When he saw that they would not leave the opening, he said: "I will show you how I can Jump." He bent to one slie then a little, darted past like an arrow, shot out between the four. The next thing the Tennas closed their inws with a snap, and almost lat cach other's noves off. Their bite was too late.

When he massed through the opening the hearts of three Tennas. They dropped dead where th

place again. He ran northwest, and from that Tenna come all that are in the world in our Tenna come all that are in the world in our time.

Tauwaikat Marimi was able to go out now and dig roots. She was free to go anywhere. While digging one day she saw the strong stalk of a shitppayu root sticking out of the ground. She dug around it and below the roots, found a little baby. The stem was growing out of the child's navel. She took the baby, twisted the stock off, and bound up the child. She had nothing to wrap around the little one, and took her skirt made of buckskin, the only clothing she wors, and wrapped it around the baby. Holding it close to her breast she foulled the baby and said:

"Grow, little boy, grow quickly, you will be commany yet for your grandmother." She brought the boy home, washed him, washed him many times, put him in a wildeat skin. When Tsawandi Kamshupa came and saw Tsuwaikai with the baby he wondered, and cried:

"Oh, grandmother, where did you find the

When Tsawanii Kamsnupa came and saw Tsuwalkai with the baby he wondered, and cried:

"Oh, grandmother, where did you find the little boy?"

She told how she had found him in the field, dug him out of the ground, and brought him home. That same day Dari Jowa, Tsawandi Kamshupa's great friend, came, and, seeing the little boy, laughed loudly.
"Oh, my aunt." said he, "that is not your baby. Where did you find that little boy?"
She told him the same story that she had told her grandson.
The baby grew large in a little while.
"Oh, my aunt," said Dari Jowa, "give this little boy to me. I want to hear him talk. I want him for myself. I will take good care of him. I want to hear him talk, I want to hear him shout. He will be a great shouter. Oh, m' aunt, give this little boy to me.
The old woman agreed at last. Dari Jowa took the boy and called him Ilhataina. One day Dari Jowa brought Ilhataina to the sweat house and said: "Talk now." Ilhataina began to talk and the sweat house trembled. He shouted, the whole earth shook. ILHATAINA."

Near Jigulmatu (Round Mountain) lived Tsorejowa, a very old woman. Once in the apring she went west to dig roots, and found a great clump of them. "I'll come to-morrow and dig these," said she, and went home.

Next morning 'he went for the roots. She dug around the whole clump, but could not pull it up. She dug deeper, pulled and tugged; at last the toots came, and on them a little boy with eyes staring out of his head. She pushed the eyes back, cured him, put him in a rabbit skin blanket which she wore, and went home. She vashed the boy all day, and did not sleep at night. She washed him all the time, When five days old he had grown a good deal. On the sixth day he crept; on the ninth he walked. When fifteen days old he was a strong but very small boy.

"I want a bow and arrows," said he.

"I want a bow and arrows," said he.

"I' want a bow and arrows," said he.

when litteen days old he was a strong but very small boy.
"I want a bow and arrows," said he.
"You must not go out," said the old woman.
"You must not leave my sight."
He teased till at last she gave him a bow, and said.

He teased till at last she gave him a bow, and said:

You must stay on the housetop, and not go away."

While he was on the house a bird flew up, perched on a tree top, and asked:

"Why doesn't your mother nurse you?"

The bird repeated this and flew away. The boy cried; came down and told his grandinother.

"Where are our people? Tell me, "said she, "but Gowila killed themall. We have no neople now."

"Who is Gowila?"

"Oh, he is strong and terrible; you must not see him."

see him."
The boy walked around the house then, looked

The boy walked around the house then, looked at the walls, and asked:
"May I have that bow hanging there?"
"You may if you like," said she, "but you are too weak to use it. You are very small, a little fellow."
He started at the east side of the sweat house and went northward, tried the first bow, broke it; went on, took another; broke that, then he went around the whole house, breaking every bow that he came to, till on the south side he reached the last bow. It was made of deer sinew. He bent that, tried his best, tried again and again, could not break it. "What kind of a bow is this," thought he. "It is the ugliest, the oldest, but I cannot break it. The bow few out of his hand, and the stone fell.
"How did the man die how used this bow?" asked the boy."

"How did the man die how used this bew?"
asked the boy.

"Gowila killed him, and those who had the
other bows." answered the old woman.

"I will go for wood now and sweat."
"De not go far." said Tsorejowa.

The boy ran off to the cast, seized a big pine
tree, tore it up with one pull, and took it home
in one hand. He made a big fire and put
stones on it.

"Bring water, my grandmother," said he,
"then I will tell you what to do. The old
woman filled a great basket with water. The
stones were dropped in when red hot, and the
water boiled quickly.
"Grandmother, put me into the boiling
water."

water boiled quickly.

"Grandmother, put me into the boiling water."

The old woman was frichtened, but did what he told her.

"Cover me closely," said the boy.

She covered him with another tight basket. He lay in the water till the cover flaw from the basket, and he was thrown through the opening of the sweat house and dropped on the roof of it. He ran down, swam in the river close by, and then went back and talked with the old woman.

"You will be very strong," said she. "You will be called lihataina."

He ran east a second time, brought sugar pines. He did not sleep, he sang without storping. Rocks were made hot as before, and dropped into a bigger basket. The old woman put in Ilhataina and covered him with four closely woven baskets. He was in the boiling water till the four covers barst off, and he seem through the opening in the top of the sweat house. He ran down again to the river, and while swimming talked to himself, saying:

"I will meet Gowila to-day. I will meet Gowila to-day."

At sunrise he went home,
"Grandmother I am color out a short way."

Gowila to-day."
At sunrise he went home.
"Grandmother, I am going out a short way,"
said he, taking down his old bow and one ar-

"Oh, grandson, you must not go far; you must not leave my sight," said the old woman.
He counted twenty otterskin quivers illed with arrows, and said, "I will take these." He counted twenty otterskin outvers illed with arrows, and said. "I will take these."

She cookel roots for his brenkfast, and brought a small basket full for him to take with him. He went west to a grove of trees, made a fire there, and caused salmon to hang all around on the tree branches. Crowds of men and women were heard talking and laughing near by he made it so. There were no people it the place. He made the noise to entice Gowlia.

He began to dig roots. He dug without raising his head, dug and worked on, singing sengs as he worked. Soon a big ugir old man from the north came. This was Gowlia. He had a great dog, and a deer head was hanging at his back, with long borns on each side of it.

"You sing a nice song," said he, "The boy said nothing; dug all the time.

"Come to the fire." said Gowlia.

The boy said nothing; dug all the time.

"Come to the fire. I am hungry," said Gowlia.

After a time Ilbataina went to the fire.

wila.

After a time Ilhataina went to the fire.

"You sing well," said Gowil:. "Where After a time Ilhatains went to the fire.
"You sing well," said Gowill. "Where
did you come from?"
"From Jigilmatu, People sing well at Jigulmatu, and they dance well."
Gowila sat down near the fire. "Put roots
in my mouth. Fut in more," said he when
the boy gave him some.
The toy fod Gowila until he had caten all
the roots in the basket.
"How many people are digging roots around
here," asked he.
"I do not know; a great many,"said Ilhatains.

"I do not know; a great many," said lihatains.

A loud noise of people was heard a short distance away, a noise of men and women laughing and talking. Gowlla saw robes and baskets near the fire. Ilhataina made the appearance of them. There was nothing there but the twenty otterskin univers and the ugly old how and one arrow in his hand.

"Give me your bow," said Gowlla; "let me look at it."

He asked again and again till the boy gave the bow. Gowlla threw it on the fire.

"Why did you is that?" asked lihataina, snatching his bow from the fire. "I would like to see your bow."

"Why did you do that?" asked Ilhataina snatching his bow from the fire. "I would like to see your bow."

Gowlla handed it to him. Ilhataina broke it with his left hand and then surang toward the east. Gowlla was very angry, and said 'Tch!" to his dog. The dog rushed at the boy. Ilhataina shet and hit the dog. He shot all the arrows but one 'rom ten gulvers. Every arrow hit but did not hurt the dog. Just then one of the seven stars like Pleiades! called to Ilhataina:

"Shoot him in the little toe and he will die."

The boy hit the dog's little toe. He fell dead. Ilhataina ran to the fire where Gowla was standing. "You cannot kill me," said he to Gowlla, 'you are big and strong, but you cannot hit me."

"I will kill you," said Gowlla, and he sent an arrow at him. It missed. Ilhataina shot his arrow and it struck. Every arrow that he sent went into Gowlla, but no arrow struck the boy. All Ilhataina's arrows but one were gone from the second ten guivers. That moment one of the roven stars called to him "Shoot at his little toe, If you hit him there he will die." Ilhataina struck Gowlla's little toe, and he drepned dead.

Ilhataina skinned Gowlla, strinned him from head to foot, put the skin on hinwelf, and breame instilke his cremy. Next he struck the dog with a red rose swife... and the dog little town and glad to see his master. Ilhataina hung the deer head behind his shoutlers, took lit gulvers, and went home. Gowlla's dog followed after him. When near the house he made heavy steps, and the old woman looked out.

made heavy steps, and the old woman looked out.

"Oh, Gowlla is coming! Gowlla is coming!" oried she, terribly trightened.

"Grandmother, don't be afraid; it is I. Gowlla is dead, I have killed him. I am wearing his skin. I am as big and as ugly as he was. I will go to his house to night, I think. I have brought his liver and lights with me."

"Go. grandson, go. I fear nobody now."

Ilhataina went away, saying: "I will be here about sunrise to-morrow." He went north to Gowlla's sweat house, went a long war, went quickly, walked up to the house, was just like Gowlla. A great many people lived in that house. All kinds of snake peo-

\*PERSONAGES.

He hung Gowija's liver and lights outside, went in, and sat down between Gowila's two wives. The dog lay down in his own place. The wives were pupila women [ducks.] two slaters.
"Bring in the meat which I hung up out-side and cook it," said lihataina to the elder wife. wife.

He cut the liver and lights into small bits and the two women belied them. There was a great steam and a strong smell from these pieces. All in the house were blind except the two wives, and only one of the blind people specific s

a great steam and a strong smell from these pieces. All in the house were blind except the two wives, and only one of the blind people spoke, Gowila's younger brother. "I smell Gowila's flesh," said he.

"How could you smell Gowila's flesh when I am Gowila's 'Ilhatana was very angry and dashed live coals through the house. All were terrified. All ats of the meat except Gowila's younger brother. He was very sharp and wouldn't touch it.

Ilhatana went out and found a great many less around the house. Gowila had exten the bedies of thousards of people and thrown the less away. Ilhataina gathered these into one places and went back to the house.

"Blind people," said he, "I wish you would sing, and you, my wives, dance for me. I'll go to sleep them."

"We will sing," said they, "and dance."

The blind people sang and the two women stopped. Ilhataina made them all drowsy, and they fell aslesse. Then he went out, fastened the door, and said: "I want the walls of this house to be covered with pitch." The whole house was covered with pitch. The whele house was covered with pitch. The whele house was covered with pitch. The whele house was covered with pitch. The whole house was covered with pitch. The whole house was covered with pitch, and then he set fire to it. Soon he heard terrible screaming inside and crowds running around in the sweat house. None could get out, and all were bound to death guickly.

Ilhataina tied the less together with a long grapevine and carried them home. He was there about daylight. He placed them all in the river and went to the house. "Hide me, and then lie on your face with your arms under your head," said he to his grandmother. The old woman put him in one basket and covered him with another, then hay herself as he had directed.

In the middle of the forenoon there was a great noise of people rising out of the river. They came in through the ton of the secat house. When all were inside the man at the back, "Who brought us to lire szain?" asked Demana. "Show we the bersau."

"Let me have him," said Ahalamila.
"No," answered Demauna; "I will keep him

"Let me have him," said Ahabamila.

"No," answered Demauna: "I will keep him myeelf."

They asked the old woman where she had found fibataina. She would not tell.

"Will you sweat?" asked Ithataina.

"Yes," said all the people.

"I will bring wood," said he.

When he ran out the sweat house danced in its nince. All thought he was too smail to carry wood, but when he saatched a tall fit the earth trembled. When he touched a big sugar pine he crushed it. He brought greatires in a moment, and when he put them down the place shivered. All were in terror.

When Bhataina talked the whole world was afraid, and when he moved the ground which he walked on was quivering.

All sweated, swam in the river, and went back to the old woman's. Ihataina walked across the house, and his heart shook as if it would frimp from his body.

"I am not going to stay here," said he.

When Demauna heard this he cried, and the old woman cried.

"Ny brother," said Demauna, "I should like to know where you are going. I wish you would stay with us."

Hataina made no answer.

"My brother," said Jurka. "If you will not

you would stay with us."

Ithataina made no answer.

"My brother," said Jupka, "If you will not stay here. I wish you would go to the sky, Now," said Jupka, "will you take beads as a sift from me?" "No." "Shells?" "No." Wideat robes?" "No." "Forskin robes?" "No." Jupka wore an old ragged rabbit-skin robe. He had worn it a long time. "I think you like this," said he. "Yes," answered Illustaina, "that's what I want." He took the old robe and tied it with weeds around his waist.
"New I am ready to leave rou. Come out

and see me go."

There was a black cloud in the sky. Ilhatains had brough: It there. "I will go up to afine had brought it there. "I will go up to hat place," said he. "Whenever rain comes in future it will be water falling from my about robe." hurried out. Jupka's sen, Julkurula, was wrapped in a black bearskin, come into the sweat house and cried; he didn't

wish to lose Illutaina.
"Now, my friends" said Ilhataina, "I leave you; hereafter where you see me travel I shall go like this." and he went with a flash to the black cloud.

A valuable suggestion is made by the Rev. Henry Swift, U. S. A., post chaplain at Fort Legan, Col., in regard to improved instruments for draught-men in laying off angles. The protractor, vice, which is an essential to the drawing outfit, may be so modified as to serve this additional purpose. Mr. Swift has in mind the gutta percha tri-angle, which has one right angle and two scute angles—the latter are often of sixty and thirty degrees respectively, but this is not essential, there being other simple ways of getting those angles; viding into thirty two, sixteen, elght, four, two gle may be made of any other suitable material.

ranged as a scale. By means of an ingentous process invented by areo Cheappont, the manufacture of sing tiles from biast furnace slag is said to be successfully carried on at the smelting works of Concha l Toro, about ten miles from Santiago de Chill. The result obtained evidently realizes an important desiderathis plan, are tapped from the blast furnace into a slig pot, and, after settling a few moments, the slag is poured from ladies into moulds; these are placed on a hearth which has a moveable cover, and the moulds being filled with sing, a cover placed on them as well as on the hearth; a very alight heat is kept up, so that the sing is very slow-ly cooled, and, when it appears black, the moulds are lifted from the hearth and the sing tiles are dumped into cold water. Made in this manner, the sing tiles are light and pertable, and, when fald, tough and durable; the slag carrying a considerable excess of dinary effectistances, it is impossible to productiles of this class of suitable dimensions without extraordinary means for toughening.

In discussing the question of the chemistry of steam raising, the Mining Presentates that it has been found that an incrustation in a botler of one-sixth of an inch thickness causes the use of about sixteen per cent, more fuel then would be necessary with clean plates, while one which is one-fourth of an inch thick involves a waste of as much as fifty per cent., and one of one half an inch involves a waste of 150 per cent.; the damage to the boiler itself is due to two causes, namely the deterioration of the plates by overheating, and the mechanical damage attending the removal of the incrustation, Purther, a coafed boiler plate is necessarily hotter han when clean, as the water is kept from free ontact with it; thus, whereas a clean fron vessel ontaining water beiling under atmospheric press are has a temperature not more than ten degrees I, above the boiling point of water, one with an incrustation as thin as one sixteenth of an inch may have a temperature more than 100 degrees C higher. The mechanical properties, too, of fled even by the temperatures proper to modern pressures, and are still more affected when there is extra heating on account of the presence of an incrustation. The new system of furnaces introduced in some of the large business and manufacturing establish-

ments in Boston for operating their stationary boiling the problem of securing nearly, if not quite, complete combustion and an almost imperceptible amount of smoke, is said by the Praces age to be based on the principle set forth by Charles Wye Williams, an expert, that in the action of the furnace about 150 cubic feet of air at atmospheric pressure are the absolute equivalents for the combustion of one pound of coal, one-third or fifty cubic feet of which is taken up by the gas, and twothirds or one hundred cubic feet by the coke, From this it follows that, to insure complete combustion and prevent smoke, it is not only essential that there should be a good draught, as generally under stood-that is, through the grates and up the chimney-but the gases arising from the ignited coal must be supplied with exygen from a source above the grates. To this end, a number of jets of superheated steam are futroduced in the furnace over ternal air by induction, which is delivered in the nidst of the combustible gases; the superheated gen and hydrogen, and with the air it has drawn into the furnace is intermingled with the combusti-ble gases arising from the coal, insuring their com-bustion and effectively preventing smoke.

# ple were there, rattlesnakes, buil anakes, water snakes, striped snakes, all kinds of snakes. He hung Gowlla's liver and lights outside,

A Reminiscence of the Ring. By A. CONAN DOYLE. Copyright, 1894, by A. Conan Doyle.

CHAPTER XVII.-CONTINUED.

The eminous figure galloped up once more longside of our curricle, but this time his mis sion was a more amiable one. "My jurisdiction ends at that ditch, sir,"

said he. "I should fancy that you could hardly wish a better place for a mill than the sloping field beyond. I am quite sure that no one will nterfere with you there." His anxiety that the fight should be brought off was in such contrast to the zeal with

which he had chased us from his county that my uncle could not help remarking upon it. breaking of the law, sir," he answered, "but if my colleague of Hampshire has no scruples about its being brought off within his jurisdic with which be spurred his horse up an adja-cent know from which he thought that he might gain the best view of t'e proceedings. And now I had a view of all those points of

stiquette and curjous survivals of custom which are so recent that we have not yet apesting to the social historian as they then were o the sportsman. A dignity was given to the contest by a rigid code of coremony, just as the clash of mail-clad knights was prefaced

that white, sleek skin and shimmering play of sinew, which made Wilson a beautiful picture. but in its stead there was a rueged grandeur of knotted and tangled muscle, as though the roots of some old tree were writhing from breast to shoulder and from shoulder to el-Even in repose the sun threw shadows upon the curves of his skin, but when he ex-erted himself every muscle bunched itself up, distinct and hard, breaking his whole trunk into gnarled knots of sinew. His skin, on face and body, was darker and harsher than that of his youthful antagonist, but he looked tougher and harder, an effect which was increased by the sombre color of his stockings and breeches. He entered the ring, sucking a lemon, with Jim Belcher and Caleb Baldwin the coster at his heels. Strolling across to the post he tied his blue bird's-eye haudkerchief over the west country yellowman, and then walked to his op-

ponent with his hand out,
"I hope I see you well. Wilson," said he. "I hope I see you well. Wilson," said he.

"Pretty tidy, I thank you," answered the other, "We'll speak to each other in a different fashion, I 'spects, afore we part."

"But no ill-feeling," said the smith, and the twe fighting men grinned at each other as they took their own corners.

"May I sak, Mr. Referec, whether these two men have been weighed?" asked Sir Lothian Hume, standing up in the outer ring.

"Their weight has just been taken under my supervision, sir," answered Mr. Craven.
"You'l man brought the scale down at thirteen three and Harrison at thirteen eight."

"He's a 15-stoner from the loins unward," cried Dutch Sam from his corner, "We'll get some of it off him before we finish."

"You'll get more off him than ever you bargained for," answered Jim Belcher, and the crowd laughed at the rough chaff.

CHAPTER XVIII.

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admiration in it, for the crowd had already had their opportunity of seeing Wilson's physique, while Harrison's was a surprise to them.

I had often looked upon the mignty arms and neck of the smith, but I had never before seen him stripped to the waist, or understood the marvellous symmetry of development which had made him in his youth the favorite model of the London sculptors. There was none of

rise above pain and fear in its training after the very humblest form of fame.

Belcher and Baldwin had pounced upon their man, and had him up and in his corner in an instant, but, in spite of the coolness with which the hardy smith took his punishment there was immease exuitation among the West country men.

"We ve got him! He's beat! He's beat!" shouted the two Jew seconds. "It's a hundred to a tirzy on Gloucester!"

"Beat, is he?" answered Belcher. You'll need to rent this field before you can beat him, for he'll stand a month of that kind of fly-flap pin." He was swinging a towel in front of Harrison as he spoke, while Baldwin mopped him with the sponge.

"How is it with you, Harrison?" asked my uncle.

"Hearty as a buck sit, It's as yields as the

uncle. "Hearty as a buck, sir. It's as right as the

"Hearty as a buck, sir. It's as right as the day,"
The cheery answer came with so merry a ring that the clouds cleared from my uncle's face,
"You should recommend your man to lead more, Tregellis," said Sir John Lade, "He'll never win it unless he leads."
"He knows more about the game than you or I do, mon ami! I'll let him take his own way."
"The betting is three to one against him now," said a sentleman, whose grizzled mous-

or I do, mon ami! Pil let him take his own way."

"The betting is three to one against him now," said a gentleman, whose grizzled moustache showed that he was an officer of the late war.

"Very true, Gen. Fitzpatrick. But you'll observe that it is the raw young bloods who are giving the odds, and the sheenies who are taking them. I still stick to my opinion."

The two men came briskly up to the scratch at the call of time, she smith a little lumpy on one side of his head, but with the same good-humored and yet menacing smile upon his lips. As to Wilson, he was exactly as he had beguin in appearance, but twice I saw bim close his lips sharply, as if he were in a sudden spasm of pain, and the blotches over his ribs were darkening from scarlet to a sullen purple. He held his guard somewhat lower, to screen this vulnerable point, and he danced round his opnonent with a lightness that showed that his wind had not been impaired by the body blows, while the smith still adopted the impassive tacter with which he had commenced.

Many rumors had come up to us from the west as to Crao Vilson's fine sclence and the quickness of his hitting, but the truth surpassed what had been expected of him. In this round and the two which follower he showed a swiftness and accuracy which old ring-siders deciared that Mendoza in his prime had never surpassed. He was in and out like lightning, and his blows were heard and feltrather than seen. But Harrison still took them all with the same dogged smile, occasionally getting in a hard body blow in return, for his adversary's height and his position combined to keep his face out of danger. At the end of the fifth round the odds were 4 to 1, and the West country men were riotors in their exultation.

"What think you now?" cried the West

his adversary's height and his position combined to keep his face out of danger. At the end of the fifth round the odds were 4 to 1, and the West country men were rictors in their exultation.

"What think you now?" cried the West Country man behind me, and in his excitement he could get no further save to repeat over and over: "What think you now?" When in the sixth round the smith was peppered twice without getting in a counter, and had the worst of the fall as well, the fellow became inarticulate allogether, and could only huzza wildly in his delight. Sir Lothian Hume was smilling and nodding his head, while my uncle was coldly impassive, though I was sure that his neart was as heavy as mine.

"This won't do, Tragellis," said Gen. Fitsparick. "My money is on the old one, but the other is the finer boxer."

"My man is to pau pass! but he will come through all right," answered my uncle.

I saw that both Beicher and Baldwin were looking grave, and I knew that we must have a change of some sort or the old tale of youth and age would be told once more.

The seventh round, however, showed the reserve strength of the hardy old fighter and lengthened the faces of those layers of odds would have given the amith his coun de grave, it was clear when the two men faced each other that Wilson had male himself up for mischief, and meant to force the fighting and maintain the lead which he had cained, but that gay gleam was not quenched set in the veteran's eyes, and still the same smile played over his grim face. He had become more jaunty, too, in the swing of his shoulders and the poise of his head, and it brought my confidence back to me to see the brisk way in which he squared up to his man.

Wilson led with his left, but was short, and, he only just avoided a danaerous right-hander, which whistled in at bis ribs. Faravo, old 'un' one of those will be a done by Index on the proponent. "Get head, but Harrison took it on his forearm, smiling snd nodding at his opponent. "Get he were and hard breathing, believe and in runde

neighbors of the West Country man, repeating his own refrain.

"Why, Dutch Sam never put in a better rally," cried Sir John Lade. "What's the betting now, Sir Lothian?"

"I have laid all that I fatend, but I don't think my man can lose it." For all that the smile had faded from his face, and I observed that he glanced continually over his shoulder into the crowd behind him.

A sullen purple cloud had been drifting alowly up from the southwest, though I dare say that out of 30,000 folk there were very few who had spared the time or attention to mark it. Now it suddenly made its presence apparent by a few heavy drops of rain, thickening rapidly into a sharp shower which

roughest kind, but the assistatic Chinaman overcame this objection by covering the whole outside with abalone shells, the hollow side being
turned out.

The Chinaman evidently did that many years
ago, when the shells were plentiful and had
scarcely any market value. Every shell used
has been destroyed, as one or more nails have
been driven through them according to their
size. Some of the shells are magnificent in
color and enormous in size. There is one at
least fitteen inches in diameter, and a duplicate
in good condition could not be bought in San
Francisco for any price. Most of the larger
shells, if they were not punctured with nail
heles, would readily sell for from Sit to 35
apiece. But that size cannot be had in the market now, and would be difficult to find on the
rocks on any part of the coast.

The general-effect of the house, when the sun
strikes it at the proper angle, is dazzling. The

atrikes it at the proper minic, is duzzling. The pollshed, pearly surfaces snarkle with astounding brilliancy and flash with all the colors of the rainbow. It is a pleasing and surprising sight, and the only pity is that so many beautiful shells were destroyed to produce it.